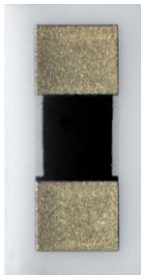
# Thin Film Microwave Resistor



Product may not be to scale

The MIC resistor chips on alumina are designed with low shunt capacitance. Most lower value resistor geometrics are compatible with strip lines, making them ideally suited for microwave circuits.

These chips are manufactured using Vishay Electro-Films (EFI) sophisticated Thin Film equipment and manufacturing technology. The MICs are 100 % electrically tested and visually inspected to MIL-STD-883.

## FEATURES

- Wire bondable
- High frequency
- Small single chip size: 0.020" x 0.040"
- Case: 0402
- Microwave resistance range: 20 Ω to 1 kΩ
- Overall resistance range: 20 Ω to 20 kΩ
- Alumina substrate
- Low stray capacitance: < 0.2 pF
- Resistor material: Tantalum nitride, self passivating
- Moisture resistant

## APPLICATIONS

Vishay EFI MIC chip resistors provide excellent high-frequency response and are ideally suited for prototyping.

Typical application areas are:

- Amplifiers
- Oscillators
- Attenuators
- Couplers
- Filters

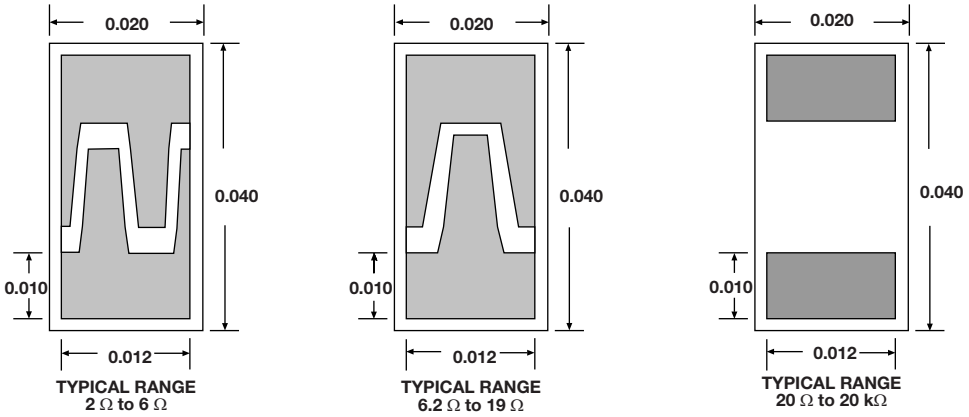
| TEMPERATURE COEFFICIENT OF RESISTANCE, VALUES, AND TOLERANCES | | |
|---|---|---|
| **PARAMETER** | **VALUE** | **UNIT** |
| Resistance Range | 2 to 20K | Ω |
| Tolerances | ± 1 | % |
| TCR | ± 25, ± 50, ± 100, ± 200 | ppm/°C |

**Note**

- Only 20 Ω to 1 kΩ are standard strip line designs for microwave applications

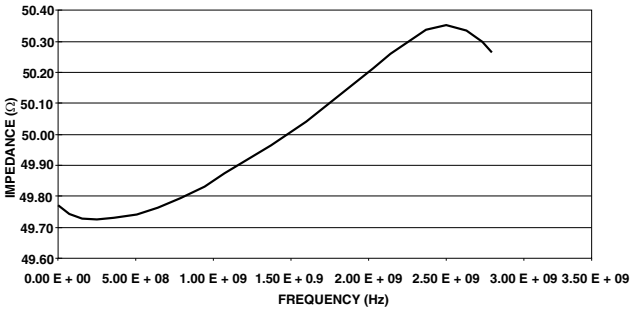
| STANDARD ELECTRICAL SPECIFICATIONS | | |
|---|---|---|
| **PARAMETER** | **VALUE** | **UNIT** |
| Noise, MIL-STD-202, Method 308 | - 20 typ. | dB |
| Moisture Resistance, MIL-STD-202, Method 106 | ± 0.1 max. $\Delta R/R$ | % |
| Stability, 1000 h, + 125 °C, 62 mW | ± 0.2 max. $\Delta R/R$ | % |
| Operating Temperature Range | - 55 to + 125 | °C |
| Thermal Shock, MIL-STD-202, Method 107, Test Condition F | ± 0.1 max. $\Delta R/R$ | % |
| High Temperature Exposure + 150 °C, 1000 h | ± 0.2 max. $\Delta R/R$ | % |
| Dielectric Voltage Breakdown | 400 | V |
| Insulation Resistance | $10^{12}$ min. | Ω |
| Operating Voltage | 100 max. | V |
| DC Power Rating at + 70 °C (Derated to Zero at 150 °C) | 0.125 max. | W |
| 5 x Rated Power Short-Time Overload, + 25 °C, 5 s | ± 0.1 max. $\Delta R/R$ | % |

## DIMENSIONS in inches




## SCHEMATIC

## IMPEDANCE VS. FREQUENCY
## 50 Ω, 20 mil x 40 mil SIZE




## MECHANICAL SPECIFICATIONS

| PARAMETER | |
|---|---|
| Chip Size | 0.020" x 0.040" ± 0.003" (0.5 mm x 1.0 mm ± 0.076 mm) |
| Chip Thickness | 0.010" ± 0.002" (0.254 mm ± 0.05 mm) |
| Chip Substrate Material | 99.6 % alumina, 2 µ" to 4 µ" finish |
| Resistor Material | Tantalum nitride, self-passivating |
| Bonding Pad Size | 0.010" x 0.012" (0.254 mm x 0.30 mm) min. |
| Number of Pads | 2 |
| Pad Material | 25 kÅ minimum gold standard |
| Backing | None |

## GLOBAL PART NUMBER INFORMATION

**Global Part Number: MIC5000BKKMSNHWS**

**Global Part Number Description: MIC 50 10 %, 100 ppm/°C, MIC trim, SnPb termination, no back metal, class H, WS**

| M | I | C | 5 | 0 | 0 | 0 | B | K | K | M | S | N | H | W | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| MODEL | RESISTANCE | RESISTANCE MULTILPLIER CODE | TOL. CODE (%) | TCR (ppm/°C) | TRIM STYLE | TERMINATION | BACK METAL | VISUAL CLASS | PACKAGING CODE |
|---|---|---|---|---|---|---|---|---|---|
| **MIC**<br>20 x 40 size microwave resistor TaN on alumina | First 4 digits are significant figures of resistance | **C** = 0.001<br>**B** = 0.01<br>**A** = 0.1<br>**0** = 1<br>**1** = 10 | **F** = 1.0<br>**G** = 2.0<br>**H** = 2.5<br>**J** = 5.0<br>**K** = 10<br>**M** = 20 | **E** = ± 25<br>**C** = ± 50<br>**K** = ± 100<br>**L** = ± 200<br>**R** = 0/- 250 | **M** = Microwave<br>**S** = Standard | **G** = Au<br>**S** = SnPb<br>**A** = Al<br>**T** = Lead (Pb)-free (e1) | **G** = Au<br>**N** = None | **H** = Class H<br>**K** = Class K | **WS** = Waffle pack 100 min, 1 mult |

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